

Solve each of the following.

1) $7^{2x-1} = 7^{5x}$

$$\begin{aligned} 2x-1 &= 5x \\ -1 &= 3x \\ \frac{-1}{3} &= \frac{3x}{3} \\ x &= -\frac{1}{3} \end{aligned}$$

2) $3^{2x+7} = 27^x$

$$\begin{aligned} 3^{2x+7} &= (3^3)^x \\ 2x+7 &= 3x \\ x &= 7 \end{aligned}$$

3) $x^{\frac{1}{5}} = 2$

$$\begin{aligned} (x^{\frac{1}{5}})^5 &= 2^5 \\ x &= 32 \\ x &= 32 \end{aligned}$$

Simplify so there are no negative exponents.

4) $\frac{18x^8y}{10x^2y^5}$

$$\frac{9x^6}{5y^4}$$

5) $(4x^4y^3)^2(-3x^{-7})$

$$\begin{aligned} (16x^8y^6)(-3x^{-7}) \\ -48xy^6 \end{aligned}$$

6) $\frac{10x^2y^5}{2x^{-3}}$

$$\begin{aligned} 5x^2x^3y^5 \\ 5x^5y^5 \end{aligned}$$

Write an equivalent expression without negative exponents.

7) $10x^3y^{-4}$

$$\frac{10x^3}{y^4}$$

8) $\frac{12x}{y^{-3}}$

$$12xy^3$$

9) 7^{-2}

$$\frac{1}{7^2} \text{ or } \frac{1}{49}$$

Applications

10) A car is purchased for \$26,000 and decreases in value at the rate of 21% per year.

$$1 - .21 = .79$$

a) What is the value of the car after 5 years? $26,000(.79)^5$

$$\underline{\$8000}$$

b) What is the value of the car after 11 years? $26,000(.79)^{11}$

$$\underline{\$1945}$$

c) Write an equation to express the value of the car after x years.

$$\underline{y = 26,000(.79)^x}$$

Write a system of equations to represent the situation and solve the problem.

11) There were 1200 people at the football game on Friday night.

$$A + S = 1200$$

Adults pay \$5 and students pay \$3. There was \$4560 taken at the gate

$$5A + 3S = 4560$$

How many adults were at the game? How many students were at the game?

$$\begin{aligned} 5A + 3S &= 4560 \\ -3A - 3S &= -3600 \\ \hline 2A &= 960 \end{aligned}$$

$$\begin{aligned} A &= 480 \text{ adults} \\ S &= 720 \text{ students} \end{aligned}$$

$$\begin{aligned} 1200 - 480 &= S \\ S &= 720 \end{aligned}$$

Chapter 4

Given the function $f(x) = 5x^2 - 2x + 3$ find the value of each expression below.

1) $f(4)$ $5(4)^2 - 2(4) + 3$
 (75)

2) $f(-3)$ $5(-3)^2 - 2(-3) + 3$
 (54)

Factor each of the following quadratics.

3) $x^2 - 5x - 6$

$(x-6)(x+1)$

4) $x^2 - 5x + 6$

$(x-3)(x-2)$

5) $8x^2 - 98$

$2(4x^2 - 49)$
 $2(2x+7)(2x-7)$

6) Write $y = x^2 + 12x - 5$ in graphing form by completing the square.

$y + 5 = x^2 + 12x$
 $y + 5 + 36 = x^2 + 12x + 36$
 $y + 41 = (x+6)^2 - 36$
 $y = (x+6)^2 - 41$

Write the equation for each parabola below.

7) A parabola with the same shape as $y = x^2$ but shifted 5 units to the left and 7 units up.

$y = (x+5)^2 + 7$

8) Give the coordinates of the **vertex** of $y = x^2 - 8x + 11$

$(4, -5)$

Find the x and y-intercepts.

$x = \frac{-8}{2(1)} = -4$ $(4)^2 - 8(4) + 11$

9) $y = x^2 - 3x - 40$

$y = (x-8)(x+5)$

x intercepts $(8,0)$ $(-5,0)$

y intercept $(0, -40)$

10) $y = x^2 - 49$

$y = (x-7)(x+7)$

x intercepts $(7,0)$ $(-7,0)$

y intercept $(0, -49)$

11) $y = 3x^2 + 17x + 20$

$x = \frac{-17 \pm \sqrt{17^2 - 4(3)(20)}}{2(3)}$
 $\frac{-17 \pm \sqrt{49 - 240}}{6}$
 $\frac{-17 \pm \sqrt{-191}}{6}$

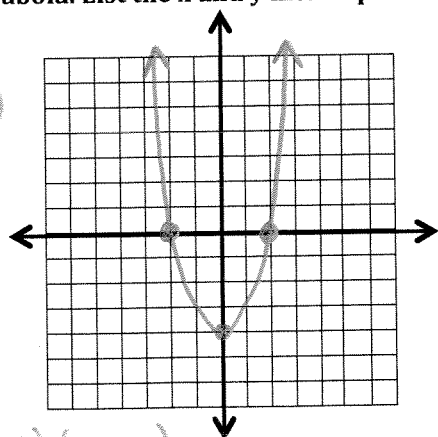
x intercepts $(-1.6, 0)$ $(-4, 0)$

y intercept $(0, 20)$

Graph each parabola. List the x and y intercepts and the vertex.

12) $y = x^2 - 4$

$(x-2)(x+2)$



x intercepts $(2,0)$ $(-2,0)$

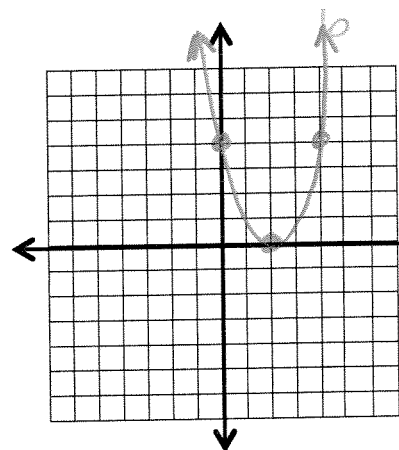
y intercept $(0, -4)$

vertex $(0, -4)$

13) $y = x^2 - 4x + 4$

$(x-2)(x-2)$

$x = \frac{4}{2} = 2$



x intercepts $(2,0)$ $(2,0)$

y intercept $(0, 4)$

vertex $(2, 0)$